

Claims

1. A transgenic plant with enhanced disease resistance and increased expression of a positive regulator of systemic acquired resistance (SAR) characterised by a transgene encoding a MAP kinase substrate 1 (MKS1) polypeptide having a primary amino acid sequence comprising:
- 5 1 (MKS1) polypeptide having a primary amino acid sequence comprising:
- a. MAP kinase interaction domain 1 with sequence:
IXGPRPXPLXVXXDSHXIKK, and
- b. transcription factor interaction domain 2 with sequence:
10 PVVIYXXSPKVVHXXXEFMXVVQRLTG, or
conservatively modified variants of said domain 1 and/or domain 2 sequence, wherein X refers to any amino acid residue.
2. The transgenic plant of claim 1, wherein said MKS1 polypeptide has an amino acid sequence selected from the group consisting of: SEQ ID No. 2, 6, 10, 14, 16, 20, 26, 27, 28 and conservatively modified variants thereof.
- 15 2. The transgenic plant of claim 2, wherein said MKS1 polypeptide is encoded by a nucleic acid molecule having a nucleic acid sequence selected from the group consisting of: SEQ ID No. 1, 5, 9, 13, 15, and 19.
- 20 4. The use of a nucleic acid molecule that hybridises at high stringency to a nucleic acid molecule having a nucleic acid sequence selected from the group consisting of: SEQ ID No. 1, 5, 9, 13, 15, and 19, as a transgene to produce the transgenic plant of claim 1, wherein said plant has enhanced disease resistance and increased expression of a positive regulator of systemic acquired resistance.

5. The use of a nucleic acid molecule according to claim 4, wherein said nucleic acid sequence is selected from the group consisting of: SEQ ID No. 1, 5, 9, 13, 15, and 19.
- 5 6. The transgenic plant of claims 1, 2 or 3, wherein said transgene comprises a homologous promoter.
7. The transgenic plant of claim 1, 2 or 3, wherein said transgene is a chimeric gene comprising a heterologous promoter.
- 10 8. The transgenic plant of claim 7, wherein said heterologous promoter is selected from the group consisting of: constitutive promoter, tissue specific promoter, and inducible promoter.
- 15 9. The transgenic plant of any one of claims 1 to 3, 6 to 8 wherein said plant is a dicotyledonous plant.
10. The transgenic plant of any one of claims 1 to 3, 6 to 8 wherein said plant is a monocotyledonous plant.
- 20 11. The transgenic plant of any one of claims 1 to 3, 6 to 8 which is selected from the group consisting of: alfalfa, carrot, cotton, potato, sweet potato, oilseed rape, radish, soybean, sugarbeet, sugar cane, sunflower, tobacco, turnip, asparagus, bean, carrot, chicory coffee, 25 celery, cucumber, eggplant, fennel, leek, lettuce, garlic, onion, papaya, pea, pepper, spinach, squash, pumpkin, tomato, brussel sprout, broccoli, cabbage, cauliflower, avocado, banana, blackberry, blueberry, grape, mango, melon, nectarine, orange, papaya, pineapple, raspberry, strawberry, apple, apricot, peach, pear, cherry, 30 plum and quince; herbs such as anise, basil, bay laurel, caper, caraway, cayenne pepper, celery, chervil, chives, coriander, dill,

horseradish, lemon balm, liquorice, marjoram, mint, oregano, parsley, rosemary, sesame, tarragon and thyme, eucalyptus, oak, pine and poplar.

- 5 12. The transgenic plant of claim 10, which is selected from the group consisting of: barley, maize, oats, rice, rye, sorghum, wheat and *Poaceae* grass.
- 10 13. The transgenic plant of claim 12, wherein said plant is a *Poaceae* grass selected from the group consisting of *Phleum* spp., *Dactylis* spp., *Lolium* spp., *Festulolium* spp., *Festuca* spp., *Poa* spp., *Bromus* spp., *Agrostis* spp., *Arrhenatherum* spp., *Phalaris* spp., and *Trisetum* spp., for example, *Phleum pratense*, *Phleum bertolonii*, *Dactylis glomerata*, *Lolium perenne*, *Lolium multiflorum*, *Lolium multiflorum westervoldicum*, *Festulolium braunii*, *Festulolium loliaceum*,
15 *Festulolium holmbergii*, *Festulolium pabulare*, *Festuca pratensis*, *Festuca rubra*, *Festuca rubra rubra*, *Festuca rubra commutata*, *Festuca rubra trichophylla*, *Festuca duriuscula*, *Festuca ovina*, *Festuca arundinacea*, *Poa trivialis*, *Poa pratensis*, *Poa palustris*,
20 *Bromus catharticus*, *Bromus sitchensis*, *Bromus inermis*, *Deschampsia caespitosa*, *Agrostis capilaris*, *Agrostis stolonifera*, *Arrhenatherum elatius*, *Phalaris arundinacea*, and *Trisetum flavescens*.
- 25 14. Seed from the transgenic plant of any one of claims 1 to 3 and 6 to 13.
- 30 15. A method for producing the transgenic plant of any one of claims 1 to 3 and 6 to 13, characterised by introducing an expression cassette comprising said transgene encoding said MKS1 polypeptide into a plant and selecting the transgenic plant and its progeny expressing said MKS1 polypeptide.

16. The method of claim 15, wherein the expression cassette is introduced into the plant through transformation.
- 5 17. The method of claim 15, wherein the expression cassette is introduced into the plant by sexual crossing with a transformed plant comprising a MKS1 transgene.
- 10 18. A recombinant vector comprising the transgene of claim 1, 2 or 3.
19. A method for detecting increased expression of MKS1 polypeptide in the transgenic plant of any one of claims 1 to 3 and 5 to 14, characterised in reacting an anti-MKS1 antibody with a protein extract derived from said plant.
- 15 20. An anti-MKS1 antibody characterised by reacting with a MKS1 polypeptide having an amino acid sequence selected from the group consisting of: SEQ ID No. 2, 6, 10, 14, 16, 20, 26, 27, 28 and conservatively modified variants thereof.
- 20 21. The anti-MKS1 antibody of claim 20, comprising a polyclonal antibody.
22. The anti-MKS1 antibody of claim 20, comprising a monoclonal antibody.
- 25 23. Use of the transgenic plant according to any one of claims 1, 2, 3 and 12 for the cultivation of a crop.
- 30 24. The crop of claim 21.

25. Use of the transgenic plant according to any one of claims 1 to 3 and 6 to 14 in a breeding program.

5 26. A plant selected in the breeding program of claim 25 having said transgene comprising a nucleic acid molecule encoding a MKS1 polypeptide.